

## GLOBE WITH MAP DETAIL DISPLAY

This invention relates to geographic displays, and more particularly to a world globe with an accessory detailed display of a selected region of the globe.

### BACKGROUND OF THE INVENTION

Spherical globes that have imprinted on their surface the map of the world are well known. They are generally provided with an axle through their north and south poles. They may be mounted on a base by the axle, so that they may be rotated for viewing a selected area. U S Patent #6,625,086 issued 9/23/2003 to Kim discloses a globe with a rotation sensor on the axle. A pointer indicates a longitude position at a particular time zone on the globe. The sensor feeds the rotation information into an electronic processor and a display indicates a major city in that time zone and also displays the current time in that time zone.

Navigational aids for providing maps in vehicles and on computers have detailed maps stored on a memory such as a computer disc. The information is retrieved by inputting some location data. This enables selection of particular map information from the memory to be displayed on a computer monitor or a small monitor, such as a battery operated liquid crystal display in a vehicle.

Globes can be imprinted with a great deal of geographic information. However, unless the world globe is very large, the details are not easily read. Because a globe is spherical, it is awkward and expensive to have a large one. It is much less awkward and costly to have detailed planar maps. They may also be more easily updated. Flat and folded maps are very useful, but they lack the perspective given by the globe.

### SUMMARY OF THE INVENTION

It is accordingly an object of the invention to provide a world globe with geographic features thereon that rotates on an axle through the north and south poles with the axle mounted on a base. The globe is not large enough to legibly carry all of the geographic and map information that the invention provides. Additional detailed information of a selected area of the globe is provided on a display attached to the globe either on the base or at another location. Detailed information, much more than can be imprinted even on a large globe, is stored on a memory such as, but not limited to, a compact disc. Input to the memory to select a detailed map of a particular area of the globe to be displayed on the display is provided by a longitudinal signal and a latitudinal signal. A rotary position sensor adapted to

sense the rotary position of the globe on the rotational axis through the north and south poles provides an east/west longitude signal. An indicator such as a transparent pointer or reticle is provided adjacent the globe surface. Mounting means for the indicator provides for relative motion between the globe and the indicator along a north/ south meridian in an arc concentric with the globe, thereby maintaining its position adjacent the globe surface. A second sensor detecting the north/south location of the indicator provides the latitude signal. The two signals enable the system to select the appropriate detailed map of that latitude and longitude from the memory and to enable it to be displayed on the display. Another feature may enable the display of a more or less magnified map if desired.

These and other objects, features, and advantages of the invention will become more apparent when the detailed description is studied in conjunction with the drawings in which like elements are designated by like reference characters in the various drawing figures.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a front elevation view of the invention.

Fig. 2 is schematic representation of the invention.

Fig. 3 is a front elevation view of another embodiment of the invention.

Fig. 4 is front elevation view of the embodiment of Fig.3 with the display panel removed.

Fig. 5 is a side elevation view of another embodiment of the invention.

Fig. 6 is a front elevation view of another embodiment of the invention.

Fig. 7 is a front elevation view of another embodiment of the invention.

Fig. 8 is a sectional view through line 8-8 of Fig. 7.

Fig. 9 is a sectional view taken through line 9-9 of Fig. 8.

Fig. 10 is a sectional view through line 10-10 of Fig. 9.

#### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now to the drawing Figs. 1-2, a globe 18 of the invention includes a sphere 4 imprinted with geographic indicia 17 representing earth on its surface. The sphere is supported on an axle element 2 that is attached to support base 1. The sphere rotates about an axis 3 through the north pole 6 and the south pole 7. A meridian member 5 extends between the two poles. An indicator 8 such as an arrow pointer is slidably mounted on the meridian member for north/south motion of the tip of the indicator on the sphere. By rotation of the sphere in the east/west direction and motion of the indicator in the north/south direction, a

particular area of the earth is located. A signal 13 from a first sensor 10 sensing rotation of the sphere and therefor longitude information, and a signal 14 from the second sensor 11 sensing sliding position of the indicator and therefor latitude information of the selected area are fed to control circuit 19. Circuit 19 selects a particular portion of the memory 12 corresponding to the selected area. That detailed map information 16 is displayed on the display 15. The memory 12 may be any of the memory media well known in the art. It may be easily replaced with updated information, or with another language. Control buttons 20 and 21 select low and high magnification map displays. Button 22 moves the display to an area east, and button 23 moves the display to an area west. Button 25 moves to -an area north, and button 26 moves to an area south. These functions are well known in the vehicle navigation and computer map display art. Button 24 displays the current time at the selected area. An internal clock 29 is set by positioning the indicator 8 at a location where the time is known, then entering the correct time using the hour button 27 and minute button 28. When moved to a different time zone, the system displays the time corrected to that time zone. Electric power is supplied through power cord 30.

Referring now to Figs. 3 and 4, another embodiment 18' of the invention is shown in which the display panel 15' is mounted on the base 1' to display a detailed map 16' and the time 31 at the location indicated by the cross hairs of the reticle 8'. The sphere 4' imprinted with geographic information 17' is mounted on an axle element 2' at the south pole with a pivot 32' at the north pole. The sphere and axle rotate together. The axle is rotatably supported by the two bearings 33 within the base. A rotary position first sensor 10' sends a signal through wire 13' to the computer circuit 19' indicating the longitudinal position of the reticle. A meridian member 5' encircles the sphere and supports the pivot 32'. The reticle is mounted on a circular element 34 that is concentric with meridian member 5' and that slides within a track on member 5'. A second sensor 11' engages the element 34 and rotates when reticle and element 34 move, sending a signal representative of the latitude of the reticle through wire 14' to the circuit 19'. The circuit 19' selects from the memory 12' a particular detailed map 16' of the selected area for display on the display 15'. A clock circuit 29' provides time for time display 31. Electric power is provided by battery 35.

Referring now to Fig. 5, another embodiment 18'' of the invention is shown in which an arcuate support 36 is affixed to a base 37. The display panel 38 is mounted on top of

arcuate support 36. The axle 40 of globe 39 is rotatably mounted on arcuate support 36 with rotary position sensor 41 sensing longitude information supplied to the control circuit 42 in the base. Rods 43 affixed to the base support a pivot 44 positioned in line with the center of the sphere. An indicator 45 positioned at the surface of the sphere is pivotally connected to the pivot 44 so that the indicator is maintained at the sphere surface as it moves in an arc concentric with the sphere along a meridian from south to north. Rotary position sensor 45 provides a signal indicative of the latitude position of the indicator to the control circuit. The control circuit selects from the memory a detail map of the area beneath the indicator to display on the display. Alternatively, the display may not be attached to the assembly, and may take the form of a video projector, a computer, and the like (not shown).

Referring now to Fig. 6, another embodiment 18'' of the invention is shown. Extending upward from the base 47 is a support element 48. Pivots 49 support a ring member 50 that encircles globe 51. At a first location 52 on ring member 50 a pivot 53 supports a first end 54 of the axle element 55, and at a second location 56 on member 50 a second pivot 57 supports a second end 58 of the axle element. The axle element may be comprised of two aligned segments. A rotary sensor 59 provides a signal related to the rotation of the globe about its axis, longitude data. An indicator 60 in the form of a light beam from a light emitting diode 63 is focused on the globe surface. Diode 63 is affixed at the end of a rigid rod 61 extending upward from the base. A rotary sensor 62 senses the rotary position of the ring member as the globe is moved under the indicator along a north south meridian for latitude data. The signals from the two sensors are applied as in the earlier embodiments. The display 64 may comprise a printer.

Referring now to Figs. 7-10 another embodiment of the invention is shown in which the latitude and longitude sensing is entirely within the globe. And, when the globe transmits some light through its walls, even the indicator selecting a particular location on the globe may be contained within the globe. With this embodiment, the user may rotate the globe on its axis and swivel the axis on pivots to move a light spot emanating from within the globe to a desired location on the globe. That area will then be displayed in detail on the video display. This embodiment uses digital optical sensing, but other angular sensing means well known in the art may be used as well.

A globe 65 may be made of a light transmitting material such as plastic. It rotates about an axle 66 passing through the north and south poles. Rotary bearings 67 hold the globe in place on the axle while permitting free rotation of the globe. The axle is fixed on the ring 68. The ring 68 swivels on pivots 69 that are affixed to the arcuate support member 70 that is mounted on the base 71. The pivots are positioned so as to be at the equator of the globe. The mechanisms for providing latitude and longitude information as well as the indicator light beam are all within the globe are best seen in Figs. 8-10. A clear transparent disc 72 is affixed to the inside surface 77 of globe 65 by tabs 76. Nine rows of opaque marks 73 with progressively increasing numbers of marks having 256 in the outermost row on the disc 72 are provided for binary signal angle detection in a manner well known in the art. The marks are not complete on the drawing. A bar 75 affixed to axle 66 has nine photo detectors 74. These sense when a mark or a space between marks is at the detector. The result of the information from the detectors indicates the rotary position of the globe relative to the base (or longitude) to one five hundred and twelfth of a circle. This longitude information signal is passed to electronics (not shown) in the base and the detail information is displayed at monitor 79.

Affixed to the axle vertically is a similarly marked second transparent disc 78 (marks not shown) for deriving latitude information. An equatorial pivot bar 83 is affixed at right angles to the axle at the equator of the globe. A sensing bar 80 rotates freely on the pivot bar 83. It is provided with a row of photo detectors 81 to sense the presence or absence of marks on the disc. A weight 84 at the end of bar 80 ensures that the bar will remain vertical when the axle is tilted on pivots 69. The disc 75 is preferably located at below 70 degrees south latitude. Because there is little detail to be displayed in the antarctic, details of that area will not generally be useful. The latitude signal from the sensors is transmitted by wire to electronics in the base as for the longitude information. The latitude and longitude signals may be transmitted wirelessly if desired. A beam of light 86 may be provided by laser light emitter 87 on the side of bar 80 to fall on the globe at the site selected by the user. The interior of the globe is lighted by a number of light emitting diodes 88 to enable the detectors to read the marks on the discs and to illuminate the globe for enhanced viewing.

While I have shown and described the preferred embodiments of my invention, it will be understood that the invention may be embodied otherwise than as herein specifically

illustrated or described, and that certain changes in form and arrangement of parts and the specific manner of practicing the invention may be made within the underlying idea or principles of the invention.